

the flexible conductor comprises

- a central electrical conductor;
- a first layer having semi-conducting properties provided around said electrical conductor;
- a solid insulating layer provided around said first layer; and
- a second layer having semi-conducting properties provided around said solid insulating layer and configured to contain an electric field in the flexible conductor.

30. A transformer according to claim 29, wherein:

- a potential on said first layer being substantially equal to a potential on the conductor.

31. A transformer according to claim 29, wherein:

- said second layer being arranged to constitute substantially an equipotential surface surrounding said conductor.

32. A transformer according to claim 31, wherein:

- said second layer being connected to a node at a predetermined potential.

33. A transformer according to claim 32, wherein:

- said predetermined potential being ground potential.

34. A transformer according to claim 29, wherein:

- at least one pair of said first layer and said solid insulating layer, and said solid insulating layer and said second layer having substantially equal thermal expansion coefficients.

35. A transformer according to claim 29, wherein:

said central electrical conductor comprises a plurality of strands of wire, only a minority of said strands being in electrical contact with each other.

36. A transformer according to claim 29, wherein:

each of said first layer, said solid insulating layer and said second layer being fixedly connected to a respective adjacent layer along substantially a whole connecting surface.

37. A transformer according to claim 29, wherein:

the flexible conductor further comprises a metal shield and a sheath.

38. A transformer according to claim 29, wherein:

a cross-section area of said central electrical conductor being in an inclusive range of 80 through 3000 mm².

39. A transformer according to claim 23, wherein:

an external diameter of the flexible conductor being in an inclusive range of 20 through 250 mm.

40. A transformer according to claim 23, further comprising:

struts of laminated magnetic material located between said high voltage winding and said low voltage winding.

41. A transformer according to claim 23, wherein:

the electric field contained in the flexible conductor being from a high voltage in said conductor in excess of 36 kV.

42. A transformer according to claim 23, wherein:

the flexible conductor being configured to handle a power in excess of 0.5 MVA.

43. A method of winding a transformer, comprising steps of:
simultaneously winding a high voltage flexible conductor and a low voltage flexible conductor configured to contain an electric field and being magnetically permeable to form a high voltage winding and a low voltage winding; and
intermixing turns of the high voltage winding with turns of the low voltage winding.

44. A method according to claim 43 wherein:
said simultaneously winding step comprises simultaneously unwinding the high voltage winding and the low voltage winding from respective drums and winding the high voltage flexible conductor and the low voltage flexible conductor on to a transformer drum.

45. A transformer comprising:
a high voltage winding having turns; and
a low voltage winding having turns, wherein,
each of said high voltage winding and said low voltage winding comprising means for handling a high voltage and containing an electric field associated with said high voltage, and
the turns of the high voltage winding being intermixed with turns of the low voltage winding.

said means for handling a high voltage includes means for setting an electric potential of an outer surface of at least one of said high voltage winding and said low voltage winding to ground potential.--